

Argo Community High School

Mathematics Department

Advanced Math Concepts

Course Description from Course Offering Book:

This course will lay the groundwork for future study of mathematics at the college level. All standard precalculus topics are presented, as well as substantial new material. Students will study topics in relations, functions, graphs, trigonometry, advanced functions and graphing, and discrete mathematics.

Completion of this course with a grade of A, B, or C (and score of 540 or higher on the SAT Math portion) will qualify the student for dual credit at MVCC (MTH 141 College Algebra: 4 credit hours AND MTH 142 Trigonometry Functions: 2 credit hours)

A TI – 83 or 84 or similar graphing calculator is strongly encouraged for this course.

Prerequisite: A or B in Algebra II or recommendation of teacher with Assistant Division Chair of Math and Science approval.

Advanced Math Concepts

Equations and Inequalities	Graphs and Graphing Utilities Linear Equations and Rational Equations Models and Applications Complex Numbers Quadratic Equations Other Types of Equations Linear Inequalities and Absolute Inequalities'
Functions and Graphs	Basics of Functions and their Graphs Linear Functions and Their Graphs Slope Transformations of Functions Combinations of Functions: Composite Functions Inverse Functions Modeling with Functions
Polynomials and Rational Functions	Complex Numbers Quadratic Functions Polynomial Functions and Their Graphs Dividing Polynomials: Remainder and Factor Theorem Zeros of Polynomial Functions Rational Functions and Their Graphs Polynomial and Rational Inequalities Modeling Using Variation
Exponential and Logarithmic Functions	Exponential Functions Logarithmic Functions Properties of Logs Exponential and Logarithmic Equations Exponential Growth and Decay; Modeling Data
Trigonometric Functions	Angle and Radian Measure Trig Functions: The Unit Circle Right Triangle Trig Trigonometric Functions of Any Angle Graphs of Sine and Cosine Functions Graphs of Other Trig Functions Inverse Trig Functions Applications of Trig Functions

Analytic Trigonometry	Verifying Trig Identities Sum and Difference Formulas Double – Angle, Power-Reducing, and Half-Angle Formulas Trig Equations
Additional Topics of Trigonometry	Law of Sines Law of Cosines Area of oblique triangles

Argo Community High School	
Mathematics Department	Algebra 1
Course Description from Course Offering Book:	
This course covers operations, properties, and patterns in algebra. It covers topics of linear equations and inequalities, systems of equations, polynomial factoring, quadratics, absolute value, and exponential functions. Time permitting radicals and elementary statistics. Successful completion of this course will build a solid foundation for future mathematics courses at ACHS. <i>A scientific calculator or similar graphing calculator is strongly encouraged for this course.</i> <i>Prerequisite: 8th grade mathematics.</i>	
Algebra 1 Curriculum	
Expressions, Equations and Functions	Evaluate Expression Apply Order of Operations Write Expressions Combining Like Terms Distributive Property Write Equations and Inequalities Rewrite Equations and Formulas Represent Functions as Rules and Tables
Solving Linear Equations	Solve One – Step Equations Solve Two – Step Equations Solve Multi-Step Equations Solve Equations with Variables on Both Sides Write Ratios and Proportions Solve Proportions Using Cross Products Rewrite Equations and Formulas
Graphing Linear Equations and Functions	Plot Points in a Coordinate Plane Graph Linear Equations Graph Using Intercepts Slope/Rate of Change Graph in Slope-Intercept Form Graph Linear Functions
Write Linear Equations	Write Linear Equations in Slope-Intercept Form Write Linear Equations in Point – Slope Form Write Linear Equations in Standard Form Write equations of Parallel and Perpendicular Lines

Solve and Graph Linear Inequalities	Solve Multi-Step Inequalities Solve Compound Inequalities Graph Linear Inequalities in Two Variables Solve Absolute Value Equations Solve Absolute Value Inequalities
Systems of Equations and Inequalities	Solve Linear Systems by Graphing Solve Linear Systems by Substitution Solve Linear Systems by Elimination Solve systems of linear inequalities
Exponents and Exponential Functions	Exponent Properties involving products Exponent Properties involving quotients Use Zero and Negative Exponents Write and Graph Exponential Growth and Decay Functions
Quadratic Equations and Functions	Graph quadratics in standard form Solve Quadratic Equations by Graphing Use Square Roots to Solve Quadratics Solve Quadratic Equations by the Quadratic Formula Solve Systems of Quadratic Equations Compare Linear, Exponential, and Quadratic Models Model Relationships
Polynomials and Factoring	Adding/Subtracting Polynomials Multiplying Polynomials Find Special Products of Polynomials Solve Polynomial Equations in factored form Factor $x^2 + bx + c$ Factor $ax^2 + bx + c$ Factor Special Products Factor Polynomials Completely

Argo Community High School	
Mathematics Department	Algebra II
Course Description from Course Offering Book: This intermediate algebra course is a continuation of algebra 1. An emphasis is places upon understanding and interpreting functions graphically and algebraically. Topics studied include quadratic functions and higher-order polynomials, rational exponents and radical functions, exponential and logarithmic functions, and an introduction to advanced topics of trigonometry. The complex number system and unit circle are introduced in this course. <i>A scientific calculator is required for this course; however, a graphing calculator is strongly encouraged</i> <i>Prerequisite: Successful completion of both Algebra 1 and Geometry and recommendation of teacher with Assistant Division Chair of Math and Science approval.</i>	
Algebra II Curriculum	
Quadratic Functions and Factoring	Graphing Quadratic Functions in Standard Form Graph Quadratics Functions in Vertex or Intercept Form Solve $x^2 + bx + c = 0$ by Factoring Solve $ax^2 + bx + c = 0$ by Factoring Solve Quadratic Equations by Finding Square Roots

	Perform Operations with Complex Numbers Use the Quadratic Formula and the Discriminant
Polynomials and Polynomial Functions	Use properties of exponents Evaluate Functions Add, Subtract and Multiply Polynomials Factor and Solve Polynomial Equations Apply the Remainder and Factor Theorems Find Rational Zeros Apply the Fundamental Theorem of Algebra Analyze Graphs of Polynomial Functions
Rational Exponents and Radical Functions	Evaluate n th roots and use rational exponents Apply properties of rational exponents Perform function operations and composition Use inverse functions Graph square root and cube root functions Solve Radical equations
Exponential and Logarithmic Functions	Graph Exponential Growth Functions Graph Exponential Decay Functions Use Functions Involving e Evaluate Logarithms Apply Properties of Logarithms Solve Exponential and Logarithmic Equations Write and Apply Exponential and Power Functions
Rational Functions	Multiply and Divide Rational Expressions Add and Subtract Rational Expressions Solve Rational Equations
Trigonometric Ratios and Functions	Use Trigonometry with Right Triangles Define General Angles and Use Radian Measure Evaluate Trigonometric Functions of Any Angle Evaluate Inverse Trigonometric Functions Apply the Law of Sines Apply the Law of Cosines

Argo Community High School

Mathematics Department

AP Calculus AB

Course Description from Course Offering Book:

This course is aligned with the course description established by the College Board and is equivalent to Calculus 1 at most universities. Students enrolled in calculus must have mastery of function properties. These functions include linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise-defined functions. Calculus focuses on the concepts of limits and continuity, derivatives and their applications, integrals, and their applications. Students enrolled in this course are required to take the Advanced Placement examination in AB Calculus. Based on this examination, the student's college will determine how much advanced placement and/or credit in college mathematics the student will receive.

A TI-Nspire, TI-84 or similar graphing calculator is required for this course.

Prerequisite: C+ or higher in Honors Pre-Calculus and recommendation of teacher with Assistant Division Chair of Math and Science approval.

AP Calculus AB Curriculum	
Limits and Continuity	Introducing Calculus: Can Change Occur at an Instant? Defining Limits and Using Limit Notation Estimating Limit Values from Graphs Estimating Limit Values from Tables Determining Limits Using Algebraic Properties of Limits Determining Limits Using Algebraic Manipulation Selecting Procedures for Determining Limits Determining Limits Using the Squeeze Theorem Connecting Multiple Representations of Limits Exploring Types of Discontinuities Defining Continuity at a Point Confirming Continuity over an Interval Removing Discontinuities Connecting Infinite Limits and Vertical Asymptotes Connecting Limits at Infinity and Horizontal Asymptotes Working with the Intermediate Value Theorem
Differentiation: Definition and Fundamental Properties	Defining Average and Instantaneous Rate of Change at a Point Defining the Derivative of a Function and Using Derivative Notation Estimating Derivatives of a Function at a Point Connecting Differentiability and Continuity; Determining When Derivatives Do and Do Not exist Applying the Power Rule Derivative Rules; Constant, Sum, Difference, and Constant Multiple Derivatives of $\cos x$, $\sin x$, e^x , and $\ln x$ The Product Rule The Quotient Rule Finding the Derivatives of Tangent, Cotangent, Secant, and/or Cosecant Functions
Differentiation: Composite, Implicit, and Inverse Functions	The Chain Rule Implicit Differentiation Differentiating Inverse Functions Differentiating Inverse Trigonometric Functions Selecting Procedures for Calculating Derivatives Calculating Higher – Order Derivatives
Contextual Applications of Differentiation	Interpreting the Meaning of Derivative in Context Straight-Line Motion: Connecting Position, Velocity, and Acceleration Rates of Change in Applied Contexts Other Than Motion Introduction to Related Rates Solving Related Rates Problems Approximating Values of a Function Using Local Linearity and Linearization Using L'Hospital's Rule of Determining Limits of Indeterminate Forms

Analytical Applications of Differentiation	Using the Mean Value Theorem Extreme Value Theorem, Global Versus Local Extrema, and Critical Points Determining Intervals on Which a function is increasing or decreasing Using the First Derivative Test to determine a Relative (Local) Extrema Using the Candidates Test to Determine Absolute (Global) Extrema Determining Concavity of Functions over Their Domains Using the second Derivative Test to Determine Extrema Sketching Graphs of Functions and Their Derivatives Connecting a Function, Its First Derivative and Its Second Derivative Introduction to Optimization Problems Solving Optimization Problems Exploring Behaviors of Implicit Relations
Integration and Accumulation of Change	Exploring Accumulations of Change Approximating Areas with Riemann Sums Riemann Sums, Summation Notation, and Definite Integral Notation The Fundamental Theorem of Calculus and Accumulation Functions Interpreting the Behavior of Accumulation Functions Involving Area Applying Properties of Definite Integrals The Fundamental Theorem of Calculus and Definite Integrals Finding Antiderivatives and Indefinite Integrals: Basic Rules of Notation Integration Using Substitution Integrating Functions Using Long Division and Completing the Square Solving Techniques for Antidifferentiation
Differential Equations	Modeling Situations with Differential Equations Verifying Solutions for Differential Equations Sketching Slope Fields Reasoning Using Slope Fields Finding General Solutions Using separation of Variables Finding Particular Solutions Using Initial Conditions and Separation of Variables Exponential Models with Differential Equations
Applications of Integration	Finding the Average Value of a Function on an Interval Connecting Position, Velocity, and Acceleration of Functions Using Integrals Using Accumulation Functions and Definite Integrals in Applied Contexts Finding the Area Between Curves Expressed as a function of x

	Finding the Area Between Curves Expressed as a function of y Finding the Area between Curves that intersect at more than two points Volumes with Cross Sections: Triangles and Semicircles Volume with Disc Method: Revolving Around the x – or y – axis Volume with Disc Method: Revolving Around Other Axes Volume with Washer Method: Revolving Around the x – or y – axis Volume with Washer Method: Revolving Around Other Axes
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Argo Community High School	
Mathematics Department	AP Computer Science A
Course Description from Course Offering Book: This course introduces students to computer science with fundamental topics that include problem solving, design strategies and methodologies, organization of data, approaches to processing data (algorithms), analysis of potential solutions, and the ethical and social implications of computing. The course emphasizes both object-oriented and imperative problem solving and design using the Java Language. This course follows the College Board's Advanced Placement curriculum and as such is extremely rigorous and fast-paced. Prerequisite: Successful completion of at least Algebra 2 , Honors Geometry 10, or Honors Algebra 2 along with teacher and Assistant Division Chair of Math and Science approval.	
AP Computer Science A Curriculum	
Primitive Types	Primitive data types including int, double, and Boolean Evaluating arithmetic expressions in program code Using assignment operators to produce a value How variables and operators are sequenced and combined in an expression to create a result
Using Objects	Objects and classes as ways to describe instances, attributes, and behaviors Creating objects by calling constructors with and without parameters Utilizing class libraries, including Integer and Double Defining an object's behavior using methods, including static and Math class Calling non-static void methods with and without parameters Using String objects and methods Using application program interfaces (APIs) and libraries

Boolean Expressions and if Statements	Finding Boolean values with expressions involving relational operators Using conditional statements to execute different statements based on input values Building on conditional statements to create multiple possible outcomes Creating the same value using equivalent Boolean expressions Referencing objects with aliases
Iteration	Creating a loop to run an expression repeatedly until certain conditions are met Standard arithmetic-based and String algorithms Representing iterative processes in code using for and while loops Nesting loop and iteration statements
Writing Classes	The makeup of a class, including whether attributes are public or private Setting an object's attributes using constructors Using comments to describe the functionality of code Defining behaviors of an object using non-void, void, and static methods Where variables can be used in program code Breaking problems into smaller parts by creating methods to solve individual subproblems Intellectual property and ethical concerns in programming
Array	Representing multiple related items as array objects Traversing an array by accessing the elements using iteration statements Standard algorithms that utilize array traversals to perform functions
ArrayList	Representing collections of related object reference data using ArrayList objects Traversing an ArrayList by accessing the elements using iteration statements Standard algorithms that utilize ArrayList traversals to perform functions Searching and sorting using standard algorithms Ethical issues around data collections
2D Array	Representing collections of data as arrays of arrays, or 2D arrays Traversing a 2D array by accessing the elements using nested iteration statements
Inheritance	Using common attributes and behaviors to group existing objects into superclasses Defining and overriding methods within subclasses and superclasses Creating references using inheritance hierarchies Associating subclass objects with superclasses to create polymorphism

Recursion	Executing recursive methods Searching and sorting using binary search and merge sort algorithms
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Argo Community High School	
Mathematics Department	AP Statistics
Course Description from Course Offering Book: This course provides college-level work in statistics, data analysis, and probability. The course is built around four broad conceptual themes: 1) Exploring Data: observing patterns, and departures from patterns; 2) Planning a Study: deciding what and how to measure; 3) Anticipating Patterns in Advance: introducing probability and simulation; and 4) Statistical Inference: confirming models. Students enrolled in this course are required to take the Advanced Placement examination in Statistics. Based on the student's performance on this examination, the student's college will determine how much advanced placement and/or credit in college statistics the student will receive. <i>A TI-Nspire or similar graphing calculator is required for this course.</i> <i>Sophomores/Juniors: Successful completion of Algebra II, Honors Geometry 10 or higher with Department Chair approval. Students must take concurrently with MA630 Advanced Math Concepts, MA940 Honors Pre-Calculus, or MA990 AP Calculus. Seniors: Successful completion of Algebra II or higher with Assistant Division Chair of Math and Science approval.</i>	
AP Statistics Curriculum	
Exploring One - Variable Data	Variation in categorical and quantitative variables Representing data using tables or graphs Calculating and interpreting statistics Describing and comparing distributions of data The normal distribution
Exploring Two - Variable Data	Comparing representations of 2 categorical variables Calculating statistics for 2 categorical variables Representing bivariate quantitative data using scatter plots Describing associations in bivariate data and interpreting correlation Linear regression models Residuals and residual plots Departures from linearity
Collecting Data	Planning a study Sampling methods Sources of bias in sampling methods Designing an experiment Interpreting the results of an experiment
Probability, Random Variables, and Probability Distributions	Using simulation to estimate probabilities Calculating the probability of a random event Random variables and probability distributions The binomial distribution The geometric distribution

Sample Distributions	Variation in statistics for samples collected from the same population The central limit theorem Biased and unbiased point estimates Sampling distributions for sample proportions Sampling distributions for sample means
Inference for Categorical Data: Proportions	Constructing and interpreting a confidence interval for a population proportion Setting up and carrying out a test for a population proportion Interpreting a p-value and justifying a claim about a population proportion Type I and Type II errors in significance testing Confidence intervals and tests for the difference of 2 proportions
Inference for Categorical Data: Means	Constructing and interpreting a confidence interval for a population mean Setting up and carrying out a test for a population mean Interpreting a p-value and justifying a claim about a population mean Confidence intervals and tests for the difference of 2 population means
Inference for Categorical Data: Chi – Square	The chi-square test for goodness of fit The chi-square test for homogeneity The chi-square test for independence Selecting an appropriate inference procedure for categorical data
Inference for Categorical Data: Slopes	Confidence intervals for the slope of a regression model Setting up and carrying out a test for the slope of a regression model Selecting an appropriate inference procedure

Argo Community High School	
Mathematics Department	College Algebra
Course Description from Course Offering Book: This 4 th year math course is a functional approach to algebra that incorporate the use of appropriate technology. Topics covered include linear and quadratic equations, systems of equations, functions (linear, quadratic, piecewise, inverse, exponential, logarithmic, polynomial, and rationals), powers, roots, radicals, and quadratic relations. Appropriate applications will be included. Completion of this course with a grade of A, B, or C (as well as score of 540 or higher in the Math portion of the SAT Test will qualify the students for dual credit at MVCC (MTH 141 College Algebra: 4 credit hours) <i>A TI-Nspire or similar graphing calculator is strongly encouraged.</i> <i>Prerequisite: Successful completion of three years of high school mathematics through Algebra II with a grade of A, B, or C and recommendation of the teacher with Assistant Division Chair of Math and Science approval.</i>	

College Algebra	
Concepts of Algebra 1	Algebraic Expressions, Mathematical Models, and Real Numbers Exponents and Scientific Notation Radicals and Rational Exponents Polynomials Factoring Polynomials Rational Expressions
Equations and Inequalities	Graphs and Graphing Utilities Linear Equations and Rational Equations Models and Applications Complex Numbers Quadratic Equations Other Types of Equations Linear Inequalities and Absolute Inequalities'
Functions and Graphs	Basics of Functions and their Graphs Linear Functions and Their Graphs Slope Transformations of Functions Combinations of Functions: Composite Functions Inverse Functions Modeling with Functions
Polynomials and Rational Functions	Complex Numbers Quadratic Functions Polynomial Functions and Their Graphs Dividing Polynomials: Remainder and Factor Theorem Zeros of Polynomial Functions Rational Functions and Their Graphs Polynomial and Rational Inequalities Modeling Using Variation
Exponential and Logarithmic Functions	Exponential Functions Logarithmic Functions Properties of Logs Exponential and Logarithmic Equations Exponential Growth and Decay; Modeling Data

Argo Community High School	
Mathematics Department	Geometry in Construction
Course Description from Course Offering Book:	
This course is cross – listed with IT350. Geometry in Construction is an integrated geometry in construction course. The common core aligned geometry curriculum is taught in the context of construction. The course is team taught by a math teacher and technology teacher. The concepts within the course are organized to complement the skills and the knowledge needed in the building process starting with foundational concepts. Students will have math days and build days. On build days, the students will be working in teams to build their projects. This course will provide students the opportunity to immediately apply what they are learning in the classroom to what they are doing on the build site. Students will receive two credits for this year long, blocked course; one elective credit, one math credit.	

Prerequisite: Algebra 1 with teacher recommendation and Assistant Division Chair of Math and Science approval.

Geometry in Construction

Essentials of Geometry	Identify Points, Lines and Planes Use Segments and Congruence Use Midpoint and Distance Formula Measure and Classify Angles Describe Angle Pairs Relationships
Reasoning and Proof	Use Postulates and Diagrams Reason Using Properties from Algebra Prove Statements about Segments and Angles Prove Angles Pair Relationships
Parallel and Perpendicular Lines	Identify Pairs of Lines and Angles Use Parallel Lines and Transversals Prove Lines Parallel Find and Use Slope of Lines Write and Graph Equations of Lines
Congruent Triangles	Apply Triangle Sum Properties Apply Congruence and Triangles Prove Triangles Congruent by SSS Prove Triangles Congruent by SAS and HL Prove Triangles Congruent by ASA and AAS Use Congruent Triangles Use Isosceles and Equilateral Triangles
Relationships within triangles	Midsegment Theorem Use Perpendicular Bisectors Use Angle Bisectors of Triangles Use Median and Altitudes Use Inequalities in a Triangle Inequalities in Two Triangles
Similarity	Use Similar Polygons Prove Triangles Similar by AA Prove Triangles Similar by SSS and SAS Use Proportionality Theorems
Right Triangles and Trigonometry	Apply the Pythagorean Theorem Use the converse of the Pythagorean Theorem Use Similar Right Triangles Special Right Triangles Apply the Tangent Ratio Apply the Sine and Cosine Ratios Solve Right Triangles
Quadrilaterals	Find Angle Measures in Polygons Use Properties of Parallelograms Show that a Quadrilateral is a Parallelogram Properties of Rhombuses, Rectangles, and Squares Use Properties of Trapezoids and Kites Identify Special Quadrilaterals
Properties of Circles	Use Properties of Tangents

	Find Arc Measures Apply Properties of Chords Use Inscribed Angles and Polygons Find Segment Lengths in Circles Write and Graph Equations of Circles
Measures of Figures and Solids	Circumference and Arc Length Areas of Circles and Sectors Areas of Regular Polygons Explore Solids Volume of Prisms and Cylinders Volume of Pyramids and Cones Surface Area and Volume of Spheres Explore Similar Solids

Argo Community High School	
Mathematics Department	Honors Algebra 1
Course Description from Course Offering Book: This accelerated honors course parallels the same outcomes as Algebra 1. (Algebra 1 covers operations, properties, and patterns in algebra. It covers topics of linear equations and inequalities, systems of equations, polynomial factoring, quadratics, absolute value, and exponential functions. Time permitting radicals and elementary statistics. Successful completion of this course will build a solid foundation for future mathematics courses at ACHS.) Mastery of these outcomes is expected.	
<i>A scientific calculator or similar graphing calculator is strongly encouraged for this course.</i>	
<i>Prerequisite: 8th grade mathematics.</i>	
Honors Algebra 1 Curriculum	
Expressions, Equations and Functions	Evaluate Expression Apply Order of Operations Write Expressions Combining Like Terms Distributive Property Write Equations and Inequalities Rewrite Equations and Formulas Represent Functions as Rules and Tables
Solving Linear Equations	Solve One – Step Equations Solve Two – Step Equations Solve Multi-Step Equations Solve Equations with Variables on Both Sides Write Ratios and Proportions Solve Proportions Using Cross Products Rewrite Equations and Formulas
Graphing Linear Equations and Functions	Plot Points in a Coordinate Plane Graph Linear Equations Graph Using Intercepts Slope/Rate of Change Graph in Slope-Intercept Form Graph Linear Functions
Write Linear Equations	Write Linear Equations in Slope-Intercept Form

	Write Linear Equations in Point – Slope Form Write Linear Equations in Standard Form Write equations of Parallel and Perpendicular Lines
Solve and Graph Linear Inequalities	Solve Multi-Step Inequalities Solve Compound Inequalities Graph Linear Inequalities in Two Variables Solve Absolute Value Equations Solve Absolute Value Inequalities
Systems of Equations and Inequalities	Solve Linear Systems by Graphing Solve Linear Systems by Substitution Solve Linear Systems by Elimination Solve systems of linear inequalities
Exponents and Exponential Functions	Exponent Properties involving products Exponent Properties involving quotients Use Zero and Negative Exponents Write and Graph Exponential Growth and Decay Functions
Quadratic Equations and Functions	Graph quadratics in standard form Solve Quadratic Equations by Graphing Use Square Roots to Solve Quadratics Solve Quadratic Equations by Completing the Square Solve Quadratic Equations by the Quadratic Formula Solve Systems of Quadratic Equations Compare Linear, Exponential, and Quadratic Models Model Relationships
Polynomials and Factoring	Adding/Subtracting Polynomials Multiplying Polynomials Find Special Products of Polynomials Solve Polynomial Equations in factored form Factor $x^2 + bx + c$ Factor $ax^2 + bx + c$ Factor Special Products Factor Polynomials Completely
Data Analysis	Analyze Surveys and Samples Use Measures of Central Tendency and Dispersion Analyze Data
Probability	Find Probabilities and Odds Find Probabilities Using Permutations Find Probabilities Using Combinations Find Probabilities of Disjoint and Overlapping Events Find Probability of Independent and Dependent Events

Argo Community High School		
Mathematics Department		Honors Algebra 2
Course Description from Course Offering Book:		
This accelerated honors course parallels the same outcomes as Algebra 2. Additional topics include 3D applications, matrices, trigonometry, rational equations, and probability. Mastery of		

these outcomes is expected. **A TI-83 or 84 or similar graphing calculator is strongly encouraged for this course.**

Prerequisite: Honors Geometry or recommendation of teacher with Assistant Division Chair of Math and Science approval.

Honors Algebra 2 Curriculum

Quadratic Functions and Factoring	Graphing Quadratic Functions in Standard Form Graph Quadratics Functions in Vertex or Intercept Form Solve $x^2 + bx + c = 0$ by Factoring Solve $ax^2 + bx + c = 0$ by Factoring Solve Quadratic Equations by Finding Square Roots Perform Operations with Complex Numbers Complete the Square Use the Quadratic Formula and the Discriminant Graph and Solve Quadratic Inequalities
Polynomials and Polynomial Functions	Use properties of exponents Evaluate and Graph Polynomial Functions Add, Subtract and Multiply Polynomials Factor and Solve Polynomial Equations Apply the Remainder and Factor Theorems Find Rational Zeros Apply the Fundamental Theorem of Algebra Analyze Graphs of Polynomial Functions
Rational Exponents and Radical Functions	Evaluate nth roots and use rational exponents Apply properties of rational exponents Perform function operations and composition Use inverse functions Graph square root and cube root functions Solve Radical equations
Exponential and Logarithmic Functions	Graph Exponential Growth Functions Graph Exponential Decay Functions Use Functions Involving e Evaluate Logarithms and Graph Logarithmic Functions Apply Properties of Logarithms Solve Exponential and Logarithmic Equations Write and Apply Exponential and Power Functions
Rational Functions	Model Inverse and Joint Variation Graph Simple Rational Functions Graph General Rational Functions Multiply and Divide Rational Expressions Add and Subtract Rational Expressions Solve Rational Equations Describe and Compare Function Characteristics
Data Analysis and Statistics	Use Combinations and the Binomial Theorem
Trigonometric Ratios and Functions	Use Trigonometry with Right Triangles Define General Angles and Use Radian Measure Evaluate Trigonometric Functions of Any Angle Evaluate Inverse Trigonometric Functions Apply the Law of Sines Apply the Law of Cosines

Argo Community High School

Mathematics Department

Honors Calculus 2

Course Description from Course Offering Book:

This course is a continuation of AP Calculus. Topics include applications of the integral, advanced integration, indeterminate forms, improper integrals, infinite series, conic sections, polar coordinates, and parametric equations. Students that scored a 3 or higher on the AP Calculus AB test are eligible to take this class for dual credit through MVCC. Dual credit students that complete this class with a C or higher will earn 5 hours of MVCC credit for MTH 151 – Calculus II/Analytic Geometry. Students can also choose to take the Calculus BC AP test.

A TI – Nspire, TI – 84, or similar graphing calculator is required for this course.

Prerequisite: Completion of AP Calculus with teacher recommendation and Assistant Division Chair of Math and Science approval.

Honors Calculus 2 Curriculum

Differentiation	Determining derivatives for elementary functions Applying differentiation rules Implicit differentiation Interpreting verbal descriptions of change as separable differential equations Sketching slope fields and families of solution curves Using Euler's method to approximate values on a particular solution curve Solving separable differential equations to find general and particular solutions Deriving and applying exponential and logistic models
Integration	Using definite integrals to determine accumulated change over an interval Approximating integrals with Riemann Sums Accumulation functions, the Fundamental Theorem of Calculus, and definite integrals Antiderivatives and indefinite integrals Properties of integrals and integration techniques, extended Determining improper integrals
Application of Integration	Determining the average value of a function using definite integrals Modeling particle motion Solving accumulation problems Finding the area between curves Determining volume with cross-sections, the disc method, and the washer method Determining the length of a planar curve using a definite integral
Infinite Sequences and Series	Applying limits to understand convergence of infinite series Types of series: Geometric, harmonic, and p-series

	A test for divergence and several tests for convergence Approximating sums of convergent infinite series and associated error bounds Determining the radius and interval of convergence for a series Representing a function as a Taylor series or a Maclaurin series on an appropriate interval
Parametric Equations, Polar Coordinates, and Vector – Valued Functions	Finding derivatives of parametric functions and vector-valued functions Calculating the accumulation of change in length over an interval using a definite integral Determining the position of a particle moving in a plane Calculating velocity, speed, and acceleration of a particle moving along a curve Finding derivatives of functions written in polar coordinates Finding the area of regions bounded by polar curves

Argo Community High School	
Mathematics Department	Honors Geometry 10
Course Description from Course Offering Book:	
This accelerated honors course parallels the same outcomes as Plane Geometry and Algebra 2. First semester will emphasize Honors Geometry while the second semester will focus on certain components of Algebra 2. Topics in this course include quadratics, exponents, radical and rational equations, and trigonometry.	
A TI-Nspire or similar graphing calculator is strongly encouraged for this course.	
Prerequisite: Honor Algebra I with a C+ or higher with teacher recommendation and Assistant Division Chair of Math and Science approval.	
Honors Geometry 10 Curriculum	
Essentials of Geometry	Identify Points, Lines and Planes Use Segments and Congruence Use Midpoint and Distance Formula Measure and Classify Angles Describe Angle Pairs Relationships Classify Polygons
Reasoning and Proof	Use Inductive Reasoning Analyze Conditional Statements Apply Deductive Reasoning Use Postulates and Diagrams Reason Using Properties from Algebra Prove Statements about Segments and Angles Prove Angles Pair Relationships
Parallel and Perpendicular Lines	Identify Pairs of Lines and Angles Use Parallel Lines and Transversals Prove Lines Parallel Find and Use Slope of Lines

	Write and Graph Equations of Lines Prove Theorems about Perpendicular Lines
Congruent Triangles	Apply Triangle Sum Properties Apply Congruence and Triangles Relate Transformations and Congruence Prove Triangles Congruent by SSS Prove Triangles Congruent by SAS and HL Prove Triangles Congruent by ASA and AAS Use Congruent Triangles Use Isosceles and Equilateral Triangles Perform Congruence Transformations
Relationships within triangles	Midsegment Theorem and Coordinate Proof Use Inequalities in a Triangle
Similarity	Use Similar Polygons Relate Transformations and Similarity Prove Triangles Similar by AA Prove Triangles Similar by SSS and SAS Use Proportionality Theorems Perform Similarity Transformations
Right Triangles and Trigonometry	Apply the Pythagorean Theorem Use the converse of the Pythagorean Theorem Use Similar Right Triangles Special Right Triangles Apply the Tangent Ratio Apply the Sine and Cosine Ratios Law of Sines Law of Cosines Area of Triangles using Trigonometry Solve Right Triangles
Quadrilaterals	Find Angle Measures in Polygons Use Properties of Parallelograms Show that a Quadrilateral is a Parallelogram Properties of Rhombuses, Rectangles, and Squares Use Properties of Trapezoids and Kites Identify Special Quadrilaterals
Properties of Transformations	Translate Figures and Use Vectors Perform Reflections Perform Rotations Apply Composition and Transformations
Properties of Circles	Use Properties of Tangents Find Arc Measures Apply Properties of Chords Use Inscribed Angles and Polygons Apply Other Angle Relationships in Circles Find Segment Lengths in Circles Write and Graph Equations of Circles
Measures of Figures and Solids	Circumference and Arc Length Areas of Circles and Sectors Areas of Regular Polygons Use Geometry Probability

	Explore Solids Volume of Prisms and Cylinders Volume of Pyramids and Cones Surface Area and Volume of Spheres Surface Area of Prisms and Cylinders Surface Area of Pyramids and Cones Explore Similar Solids
Quadratic Functions and Factoring	Graphing Quadratic Functions in Standard Form Graph Quadratics Functions in Vertex or Intercept Form Solve $x^2 + bx + c = 0$ by Factoring Solve $ax^2 + bx + c = 0$ by Factoring Solve Quadratic Equations by Finding Square Roots Perform Operations with Complex Numbers Complete the Square Use the Quadratic Formula and the Discriminant Graph and Solve Quadratic Inequalities
Polynomials and Polynomial Functions	Use properties of exponents Evaluate and Graph Polynomial Functions Add, Subtract and Multiply Polynomials Factor and Solve Polynomial Equations Apply the Remainder and Factor Theorems Find Rational Zeros Apply the Fundamental Theorem of Algebra Analyze Graphs of Polynomial Functions
Rational Exponents and Radical Functions	Evaluate nth roots and use rational exponents Apply properties of rational exponents Perform function operations and composition Use inverse functions Graph square root and cube root functions Solve Radical equations
Trigonometric Ratios and Functions	Use Trigonometry with Right Triangles Define General Angles and Use Radian Measure Evaluate Trigonometric Functions of Any Angle Evaluate Inverse Trigonometric Functions Apply the Law of Sines Apply the Law of Cosines

Argo Community High School	
Mathematics Department	Honors Plane Geometry
Course Description from Course Offering Book: This accelerated honors course parallels the same outcomes as Algebra I and Plane Geometry. First semester will emphasize Algebra while infusing Geometry. Second semester will focus on Plane Geometry while incorporating Algebraic concepts where appropriate.	

A TI-Nspire or similar graphing calculator is strongly encouraged for this course.

Prerequisite: 8th grade Algebra 1 class and recommendation of 8th grade teacher

Honors Plane Geometry Curriculum

Expressions, Equations and Functions	Evaluate Expression Apply Order of Operations Write Expressions Combining Like Terms Distributive Property Write Equations and Inequalities Rewrite Equations and Formulas Represent Functions as Rules and Tables
Solving Linear Equations	Solve One – Step Equations Solve Two – Step Equations Solve Multi-Step Equations Solve Equations with Variables on Both Sides Write Ratios and Proportions Solve Proportions Using Cross Products Rewrite Equations and Formulas
Graphing Linear Equations and Functions	Plot Points in a Coordinate Plane Graph Linear Equations Graph Using Intercepts Slope/Rate of Change Graph in Slope-Intercept Form Graph Linear Functions
Write Linear Equations	Write Linear Equations in Slope-Intercept Form Write Linear Equations in Point – Slope Form Write Linear Equations in Standard Form Write equations of Parallel and Perpendicular Lines
Solve and Graph Linear Inequalities	Solve Multi-Step Inequalities Solve Compound Inequalities Graph Linear Inequalities in Two Variables Solve Absolute Value Equations Solve Absolute Value Inequalities
Systems of Equations and Inequalities	Solve Linear Systems by Graphing Solve Linear Systems by Substitution Solve Linear Systems by Elimination Solve systems of linear inequalities
Exponents and Exponential Functions	Exponent Properties involving products Exponent Properties involving quotients Use Zero and Negative Exponents Write and Graph Exponential Growth and Decay Functions
Quadratic Equations and Functions	Graph quadratics in standard form Solve Quadratic Equations by Graphing Use Square Roots to Solve Quadratics Solve Quadratic Equations by Completing the Square Solve Quadratic Equations by the Quadratic Formula
Polynomials and Factoring	Adding/Subtracting Polynomials

	Multiplying Polynomials Find Special Products of Polynomials Solve Polynomial Equations in factored form Factor $x^2 + bx + c$ Factor $ax^2 + bx + c$ Factor Special Products Factor Polynomials Completely
Essentials of Geometry	Identify Points, Lines and Planes Use Segments and Congruence Use Midpoint and Distance Formula Measure and Classify Angles Describe Angle Pairs Relationships Classify Polygons
Reasoning and Proof	Use Inductive Reasoning Analyze Conditional Statements Apply Deductive Reasoning Use Postulates and Diagrams Reason Using Properties from Algebra Prove Statements about Segments and Angles Prove Angles Pair Relationships
Parallel and Perpendicular Lines	Identify Pairs of Lines and Angles Use Parallel Lines and Transversals Prove Lines Parallel Find and Use Slope of Lines Write and Graph Equations of Lines Prove Theorems about Perpendicular Lines
Congruent Triangles	Apply Triangle Sum Properties Apply Congruence and Triangles Relate Transformations and Congruence Prove Triangles Congruent by SSS Prove Triangles Congruent by SAS and HL Prove Triangles Congruent by ASA and AAS Use Congruent Triangles Use Isosceles and Equilateral Triangles Perform Congruence Transformations
Relationships within triangles	Midsegment Theorem and Coordinate Proof Use Inequalities in a Triangle
Similarity	Use Similar Polygons Relate Transformations and Similarity Prove Triangles Similar by AA Prove Triangles Similar by SSS and SAS Use Proportionality Theorems Perform Similarity Transformations
Right Triangles and Trigonometry	Apply the Pythagorean Theorem Use the converse of the Pythagorean Theorem Use Similar Right Triangles Special Right Triangles Apply the Tangent Ratio

	Apply the Sine and Cosine Ratios Solve Right Triangles Law of Sines Law of Cosines Areas of Triangles with Trigonometry
Quadrilaterals	Find Angle Measures in Polygons Use Properties of Parallelograms Show that a Quadrilateral is a Parallelogram Properties of Rhombuses, Rectangles, and Squares Use Properties of Trapezoids and Kites Identify Special Quadrilaterals
Properties of Transformations	Translate Figures and Use Vectors Perform Reflections Perform Rotations Apply Composition and Transformations Identity Symmetry
Properties of Circles	Use Properties of Tangents Find Arc Measures Apply Properties of Chords Use Inscribed Angles and Polygons Apply Other Angle Relationships in Circles Find Segment Lengths in Circles Write and Graph Equations of Circles
Measures of Figures and Solids	Circumference and Arc Length Areas of Circles and Sectors Areas of Regular Polygons Use Geometry Probability Explore Solids Volume of Prisms and Cylinders Volume of Pyramids and Cones Surface Area and Volume of Spheres Explore Similar Solids
Plane Figures	Area of Plane Figures Surface Area of Prisms/Cylinders Surface Area of Pyramids/Cones

Argo Community High School	
Mathematics Department	Honors Pre-Calculus
Course Description from Course Offering Book: This course covers systems of equations, graphing, rational and polynomial functions, trigonometry, exponential and logarithmic functions, and conics. Additional topics include parametric equations, polar equations, and statistics. Topics will be studied in great depth in preparation for AP Calculus.	
A TI-Nspire or similar graphing calculator is strongly encouraged for this course.	
Prerequisite: C+ or higher in Honors Algebra II or Honors Geometry 10 and recommendation of teacher with Assistant Division Chair of Math and Science approval.	

Honors Pre-Calculus Curriculum	
Functions and Graphs	Basics of Functions and their Graphs Linear Functions and Their Graphs Slope Transformations of Functions Combinations of Functions: Composite Functions Inverse Functions Distance and Midpoint Formula; Circles Modeling with Functions
Polynomials and Rational Functions	Complex Numbers Quadratic Functions Polynomial Functions and Their Graphs Dividing Polynomials: Remainder and Factor Theorem Zeros of Polynomial Functions Simplifying Rational Functions Operations of Rational Functions Solving Rational Equations Rational Functions and Their Graphs Polynomial and Rational Inequalities Modeling Using Variation
Exponential and Logarithmic Functions	Exponential Functions Logarithmic Functions Properties of Logs Exponential and Logarithmic Equations Exponential Growth and Decay; Modeling Data
Trigonometric Functions	Angle and Radian Measure Trig Functions: The Unit Circle Right Triangle Trig Trigonometric Functions of Any Angle Graphs of Sine and Cosine Functions Graphs of Other Trig Functions Inverse Trig Functions Applications of Trig Functions
Analytic Trigonometry	Verifying Trig Identities Sum and Difference Formulas Double – Angle, Power-Reducing, and Half-Angle Formulas Product – to – Sum and Sum – to – Product Trig Equations
Additional Topics of Trigonometry	Law of Sines Law of Cosines Polar Coordinates Graphs of Polar Coordinates Complex Numbers in Polar Form; Demoivre's Theorem Vectors The Dot Product
Systems of Equations and Inequalities	Systems of Linear Equations in Two Variables Systems of Linear Equations in Three Variables Partial Fractions Systems of Nonlinear Equations in Two Variables

	Systems of Inequalities Linear Programming
Matrices and Determinants	Matrix Solutions to Linear Systems Inconsistent and Dependent Systems and Their Applications Matrix Operations and Their applications Multiplicative Inverses of matrices and matrix equations Determinants and Cramer's Rule
Conic Sections and Analytic Geometry	The Ellipse The Hyperbola The Parabola Rotation of Axes Parametric Equations
Sequences and Probability	Sequences and Summation Notation Arithmetic Sequences Geometric Sequences and Series The Binomial Theorem Math Induction Counting Principles, Permutations, Combinations Probability

Argo Community High School	
Mathematics Department	Introduction to Algebra and Geometry
Course Description from Course Offering Book: This course is geared to introduce students to high school level mathematics. It will establish math study and organization skills as well as the reinforcement of basic math skills. The course will introduce Pre-Algebra and Pre-Geometry concepts throughout the year. Students will explore arithmetic operations, number systems and properties, both solving and graphing linear and non-linear equations, measurement, geometry, and an introduction to algebraic thinking and applications. <i>A scientific calculator is required for this course.</i>	
Introduction to Algebra and Geometry	
Integers	Add Integers and Subtract Integers Understand and use the Additive Inverse Add and Subtract Integers with Negative Numbers Multiply Single Digit Integers Multiply Double-Digit Integers Definition of Division Venn Diagrams Divide using Long Division Understand Exponents and Write Powers in Expanded Form Simplify using Order of Operations Absolute Value and Absolute Value Order of Operations
Number Sense and Algebraic Thinking	Use Divisibility Rules Find Factors Identify the Prime and Composite Numbers Find Multiples of Integers Find the Least Common Multiple Between Integers Write the Prime Factorization of Integers

	Find the Greatest Common Factor Between Integers
Intro to Fractions/Decimals	Understand Fractions Simplify Fractions Identify Equivalent Fractions Understand Place Value and Expanded Form of Decimals Write Decimals as Fractions Compare and Round Decimals Add and Subtract Decimals
Percents	Convert Back and Forth Between Decimal and Percent Form Convert Fractions to Percent Write and Reduce Ratios Write and Solve Proportions Find the Percent of a Number Find the Whole from a Percent and a Number Find What Percent One Number is of Another
Operations with Fractions	Add and Subtract Fractions with Like Denominators Add and Subtract Fractions with Unlike Denominators Convert Between Improper Fractions and Mixed Numbers Multiplying Fractions Dividing Fractions Compare and Order Fractions
Solving Equations	Solve One-step equations Solve Two-step equations Solving by Combining like Terms Solve using the Distributive Property Solve Equations with Variables on both sides Solve Advanced Equations
Ratio and Proportion	Translate Verbal to Algebraic Expression Solve Advanced Proportion Use Ratios, Rates, and Unit Rates Set up and Solve Proportions in Real World Applications
Intro to Geometry	Understand Points, Lines, and Segments Use and Understand Segment Addition Postulate/Segment Addition/Segment Bisectors Name and Understand Angles/Angle Addition/Angle Bisectors Identify and Apply Supplementary and Complementary Angles Identify and Apply Vertical Angles
Graphing Linear Functions	Plot Points/Understand the Coordinate Plane Understand a Relation/Use a Table of Values Understand Slope and Rate of Change Graph Lines using Slope-Intercept Form
Writing Linear Functions	Graph Lines using Intercepts Write an Equation Given the Slope and y-int Find the Slope between 2 points Write equations given 2 points Put into slope – intercept form
Properties of Geometric Figures	Find missing angles of a triangle Understand Perimeter and Area Understand Square Roots

	Solve for Missing Sides of a Triangle using the Pythagorean Theorem
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Argo Community High School	
Mathematics Department	Plane Geometry
Course Description from Course Offering Book:	
The Geometry course is a comprehensive look at the study of geometric concepts including the basic elements of geometry, proofs, parallel and perpendicular lines, the coordinate plane, triangles, quadrilaterals, polygons, circles, trigonometry, congruence and similarity, surface area, volume and transformations. Algebra skills are used extensively through the curriculum. <i>A scientific calculator or similar graphing calculator is strongly encouraged for this course.</i> <i>Prerequisite: Successful completion of Algebra 1 and teacher recommendation with Assistant Division Chair of Math and Science approval.</i>	
Plane Geometry Curriculum	
Essentials of Geometry	Identify Points, Lines and Planes Use Segments and Congruence Use Midpoint and Distance Formula Measure and Classify Angles Describe Angle Pairs Relationships Classify Polygons
Reasoning and Proof	Use Inductive Reasoning Analyze Conditional Statements Apply Deductive Reasoning Use Postulates and Diagrams Reason Using Properties from Algebra Prove Statements about Segments and Angles Prove Angles Pair Relationships
Parallel and Perpendicular Lines	Identify Pairs of Lines and Angles Use Parallel Lines and Transversals Prove Lines Parallel Find and Use Slope of Lines Write and Graph Equations of Lines
Congruent Triangles	Apply Triangle Sum Properties Apply Congruence and Triangles Relate Transformations and Congruence Prove Triangles Congruent by SSS Prove Triangles Congruent by SAS and HL Prove Triangles Congruent by ASA and AAS Use Congruent Triangles Use Isosceles and Equilateral Triangles Perform Congruence Transformations
Relationships within triangles	Midsegment Theorem Use Perpendicular Bisectors Use Angle Bisectors of Triangles Use Median and Altitudes Use Inequalities in a Triangle

	Inequalities in Two Triangles
Similarity	Use Similar Polygons Relate Transformations and Similarity Prove Triangles Similar by AA Prove Triangles Similar by SSS and SAS Use Proportionality Theorems Perform Similarity Transformations
Right Triangles and Trigonometry	Apply the Pythagorean Theorem Use the converse of the Pythagorean Theorem Use Similar Right Triangles Special Right Triangles Apply the Tangent Ratio Apply the Sine and Cosine Ratios Solve Right Triangles
Quadrilaterals	Find Angle Measures in Polygons Use Properties of Parallelograms Show that a Quadrilateral is a Parallelogram Properties of Rhombuses, Rectangles, and Squares Use Properties of Trapezoids and Kites Identify Special Quadrilaterals
Properties of Transformations	Translate Figures and Use Vectors Perform Reflections Perform Rotations Apply Composition and Transformations Identify Symmetry Identify and Perform Dilations
Properties of Circles	Use Properties of Tangents Find Arc Measures Apply Properties of Chords Use Inscribed Angles and Polygons Apply Other Angle Relationships in Circles Find Segment Lengths in Circles Write and Graph Equations of Circles
Measures of Figures and Solids	Circumference and Arc Length Areas of Circles and Sectors Areas of Regular Polygons Use Geometry Probability Explore Solids Volume of Prisms and Cylinders Volume of Pyramids and Cones Surface Area and Volume of Spheres Explore Similar Solids

Argo Community High School

Mathematics Department

Smart Money

Course Description from Course Offering Book:

This course will introduce students to mathematics in the real world. The course will apply students' algebra skills developed in their previous years of math to topics like consumer math, career planning, checking and savings accounts, paying for college, types of credit, managing credit,

insurance, and investing. Activities and projects with real life applications will be the theme for each unit.

Prerequisite: Successful completion of at least two years of high school mathematics and recommendation of teacher with Assistant Division Chair of Math and Science approval.

Smart Money

Checking	The Essential Checking Account Read the Fine Print Classic Checking Skills Online & Mobile Banking Select a Checking Account
Savings	Savings Basics Why We Save How We Save Select a Savings Account
Types of Credit	Credit Basics Intro to Credit Cards Select a Credit Card Understanding Loans Auto Loans and Leases Student Loans Mortgages
Managing Credit	Basics of Managing Credit Credit History and Reports Credit Scores Managing Debt
Paying for College	Paying the College Basics Gateway to Financial Aid Scholarships and Grants: Free Money Student Loans: Friend or Foe? Deciphering Your Financial Aid Package Budgeting in College Repaying Your college Loans
Budgeting	Complete a Budget Budgeting for Food
Investing	Why Should I Invest What is Stock What is a Bond Managing Risk Investing in Funds What's Your Investment Strategy The Importance of Investing for Retirement How to Invest for Retirement Modern Investing
Consumer Math	Unit Rate Sales Tax Tipping Percent Discount Behavior Math Are you Really in Control of Your Decisions?

	Let It Go Everyone Else is Doing It I saw it on Social Media
Career	Basic Career Choosing a Career Workplace Skills Finding a Job Resumes Interviewing for a Job Outcomes of a Job Interview Starting a New Job
Taxes	The U.S. Tax System Important Tax Forms Do I need to File a Return? Filing your Return Dive Deeper into Taxes
Insurance	Insurance Fundamentals Health Insurance 101 Auto Insurance Home and Renters Insurance Other Types of Insurance